

The opinion in support of the decision being entered today
was **not** written for publication and
is **not** binding precedent of the Board.

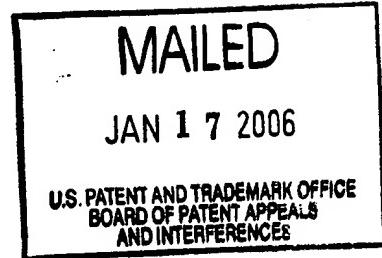
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HO YOUNG CHOI,
HEE JONG MOON AND MAN HYO PARK

Appeal No. 2005-2628
Application No. 09/514,250

ON BRIEF



Before: THOMAS, BARRY and NAPPI, **Administrative Patent Judges**.

NAPPI, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 (a) of the final rejection of claims 19 through 25 and 61 through 82. For the reasons stated *infra* we affirm the examiner's rejection of these claims.

Invention

The invention relates to a projection lens system for use in a projection system. The lens system includes several refractive lenses and at least one diffractive optical element formed on the surface of one of the refractive lenses. See page 6 of appellants' specification.

Claim 19 is representative of the invention and is reproduced below:

19. A projection lens system, comprising:
a first lens having a positive refractive power at the center thereof and a negative refractive power at the peripheral thereof;
a second lens having a relatively large positive refractive power;
a third lens having a positive refractive power;
a forth lens having a negative refractive power; and
a diffractive optical element formed on at least one surface of said lenses.

References

The references relied upon by the examiner are:

Ogata	5,982,544	November 9, 1999 (filed July 2, 1998)
Maruyama et al (Maruyama)	5,838,496	November 17, 1998
Moskovich	4,776,681	October 11, 1988

Rejections at Issue

Claims 19 through 25, 61, 62, 63, 65 through 69, 71 through 75 and 77 through 82 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over

Moskovich in view of Ogata. Claims 64, 70 and 76 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Moskovich in view of Ogata and Maruyama.

Opinion

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellants' argument set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

With full consideration being given to the subject matter on appeal, the examiner's rejections and the arguments of appellants and the examiner, and for the reasons stated *infra* we sustain the examiner's rejections of claims 19 through 25 and 61 through 82 under 35 U.S.C. § 103(a).

Rejection of claim 19 and claims grouped with claim 19.

On page 10 of the brief, appellants argue that the rejection of claim 19 is improper as there is no motivation to modify Moskovich's invention to include a diffractive element. Appellants reason that Moskovich provides "a complete, aberration corrected projection lens system." Further, on pages 11 and 12 of the brief appellants argue that since Moskovich provides a complete lens system, the addition of a diffractive optical element would introduce new aberrations.

Appellants assert:

[T]he addition of a diffractive optical element into the Moskovich system would not be obvious, as such addition or substitution of a diffractive optical element would not provide any additional optical benefits, but rather may create its own problems and aberrations. This is contrary to the Office Action's statements that forming a diffractive optical element on a lens in Moskovich would correct aberrations in a projector lens system as such corrections were already accounted for by the Moskovich system.

Finally, appellants argue on page 12 of the brief, that because a thin lens system is desired, the claim calls for a four lens system rather than a six lens system such as Ogata.

Appellants arguments have not overcome the examiner's *prima facie* case of obviousness. In rejecting claims under 35 U.S.C. § 103 (a), the examiner bears the initial burden of establishing a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). **See also** *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. **See also** *Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. An obviousness analysis commences with a review and consideration of all the pertinent evidence and

arguments. “In reviewing the [E]xaminer’s decision on appeal, the Board must necessarily weigh all of the evidence and arguments.” *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444). In addition, our reviewing court stated in *In re Lee*, 277 F.3d at 1343, 61 USPQ2d at 1433, that when making an obviousness rejection based on a combination, “there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by Applicant” (quoting *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998)).

On pages 7 through 12 of the answer, the examiner provides a comprehensive response to appellants’ argument and clearly sets forth evidence to make the specific combination asserted in statement of rejection. In summary, the examiner reasons that Moskovich provides a “better correction” for aberrations not a complete correction of aberrations. Further, Moskovich discusses correction of spherical aberrations but does not mention other types of aberrations. The examiner finds that Ogata teaches that a diffractive surface can be used in lens systems to correct for chromatic aberrations. Thus, the examiner finds that Ogata provides motivation to modify Moskovich.

We consider that the examiner’s response on pages 7 through 11 of the answer to present ample evidence of motivation to combine. Further, we find the examiner’s rejection is sufficient to establish a *prima facie* case of obviousness. For the sake of brevity, we do not repeat the examiner’s reasoning.

We do not consider appellants' argument, that one would be discouraged from using a diffraction element in Moskovich's lens system as such a modification would introduce additional aberrations, to overcome the examiner's *prima facie* case of obviousness. We concur with the examiner's finding that Moskovich does not discuss correcting chromatic aberrations and that Ogata teaches use of diffractive elements in a lens to correct chromatic aberrations. While we consider that incorporation of diffractive elements into Moskovich's lens system may require adjustments to the lenses used in the lens system, appellants have presented no evidence that such adjustments would require more than routine experimentation, nor have appellants identified any claim limitations directed to such adjustments. In the absence of evidence to the contrary, we consider Ogata to provide ample motivation to use diffraction elements in the lens system of Moskovich and any adjustments to the lenses to be within the realm of routine experimentation.

Further, we are not persuaded by Appellants' argument, on page 12 of the brief, that since a thin lens system is desired, the claim is directed to a four lens system instead of a six lens system such as Ogata. Initially, we note that claim 19 states, "a projection lens system, comprising." Thus, claim 19 uses inclusive claim language; as such the scope of the claim includes lens systems that contain four lenses but is not limited to systems of only four lenses. Further, Moskovich teaches a four lens system and Ogata is relied upon as teaching using a diffraction element to correct chromatic aberrations.

Finally, we are not persuaded by appellants' argument in the reply brief that Ogata is concerned with a lens for a camera and as such must correct aberrations over a broad spectrum, whereas the invention teaches individual lens modules for each of red, green and blue light sources in a projection system. We note that there is no limitation in claim 19 directed to the source of light for the lens system. Further, Moskovich, the reference being modified by the combination with Ogata, teaches that the projection lens is for a cathode ray tube (CRT) but makes no mention of there being three light sources.

For the forgoing reasons we sustain the examiner's rejection of independent claim 19 under 35 U.S.C. § 103 (a).

On page 5 of the brief, appellants group claims 20-25, 65, 71, 77 and 79 with claim 19.¹ Appellants have not addressed dependent claim 82 in their grouping of claims. Accordingly, we group claim 19 with dependent claims 20 through 25, 65, 71, 77, 79 and 82 (all of which are dependent upon claim 19). Thus, we sustain the examiner's rejection of claims 20 through 25, 65, 71, 77, 79 and 82 under 35 U.S.C. § 103 (a) for the reasons stated *supra* with respect to claim 19.

Rejection of claim 67 and claims grouped with claim 67.

Appellants argue on page 13 of the brief:

[O]ne of ordinary skill in the art would either use the lens system from Moskovich without any diffractive optical elements as the equation based lenses make all corrections needed for Moskovich's lens system, or would use the diffractive optical element of Ogata with Ogata's six lens system

¹ We note that dependent claims 71, 77 and 79 are not ultimately dependent upon claim 19. Nonetheless, we accept appellants' grouping of claims 71, 77 and 79 with claim 19.

requiring aberration correction. However, since Moskovich requires equation satisfaction for its four lens system, one of ordinary skill in the art would not use both a diffractive optical element and Moskovich's lens system requiring satisfaction of the equation as such addition would be redundant and may cause problems, as mentioned above, nor would any motivation exist to make such a combination.

Further, appellants argue that Moskovich teaches that the equation includes an aspheric coefficient corresponding to the fourteenth order, which is not included in claim 67.

On pages 12 and 13 of the answer, the examiner provides a compressive response to appellants' argument and clearly explains her findings as to how Moskovich teaches the claimed sag equation. In summary, the examiner explains that the sag equation is a known equation to describe the aspherical surface of a lens. The examiner argues that the higher order of the equation, i.e. inclusion of a term to the 14th power, does not change the shape of the lens but, rather provides a more accurate description of the surface.

We concur with the examiner's description of Moskovich on pages 12 and 13 of the answer. Additionally, we note that claim 67 includes limitations that the shape of the first, third and forth lens are defined by the sag equation. However, the specific variables A to E which "define aspheric coefficients" are not claimed.

As such, we find that the actual shape of the lenses are not claimed, but rather the claim limitation is directed to the type of shape of the lenses. The type of shape is defined or described by the equation. We find that Moskovich teaches the sag equation in column 5, lines 30 through 35, which can includes terms out

to the 12th and 14th order. We concur with the examiner, that the higher the order, the greater the precision with which the actual shape of the lens is defined by the equation. Thus, we find that Moskovich teaches the shape of the lens claimed, in that it can be defined by the sag equation. Moskovich teaches that the equation defines the shape in greater precision, by using a term to 14th order. Additionally, we note that Moskovich teaches that the coefficient associated with the 14th order term is "l". In Moskovich's tables I through X (see columns 8 through 14) coefficient "l" is a very small number. Thus, the term to the 14th order, which is multiplied by "l", will be very small and as the examiner asserts, the 13 of the brief, the 14th order term will have a negligible effect on the description of the lens. For the forging reasons, we sustain the examiner's rejection of claim 67 under 35 U.S.C. § 103 (a).

On page 5 of the brief, appellants group claims 61 and 78 with claim 67. Accordingly, we sustain the examiner's rejection of claims 61 and 78 for the same reasons stated with respect to claim 67.

Rejection of claim 62 and claims grouped with claim 62.

Appellants argue on pages 15 and 16 of the brief:

Ogata does not disclose or suggest using a diffractive optical element in combination with a four lens projection lens system as recited in claim 62. Nor would it be an obvious modification to one skilled in the art to just eliminate two of Ogata's six lenses or to use a diffractive optical element in such a manner with the specified characteristics, as none of the cited references disclose primarily creating any chromatic aberrations using any lens, let alone a fourth lens, then correcting these chromatic aberrations in a diffractive optimal element. This combination in the claimed invention

was intentionally applied to make a thin, chromatically accurate projection lens system where each lens was specifically chosen and a diffractive optical element was specifically chosen and a diffractive optical element was specifically placed to achieve a predetermined desired result. Therefore, the combination of the lenses and the diffractive optical element is novel and nonobvious to make a thinner projection lens system with proper chromatic dispersion characteristics. Further, although diffractive optical elements are admittedly used to correct certain aberrations, none of the cited references suggest or intimates [sic] that aberrations should intentionally be created for offset with a diffractive optical element, which is used in the claimed invention to decrease the thickness of the projection lens system.

The examiner provides a compressive response to appellants' argument at pages 13 and 14 of the answer. On page 13 of the answer, the examiner points out that claim 62 does not contain a limitation directed to a lens where the chromatic dispersion characteristics are corrected by the combination of the fourth lens and a diffractive element. Further, the examiner states that the claim term "chromatic dispersion characteristics" is interpreted as "*the sign or direction of the chromatic dispersion.*" The examiner finds on page 14 of the answer:

[I]t is explicitly taught by Ogata that the chromatic dispersion characteristics, such as sign or direction, are opposite to the chromatic dispersion of a refractive lens. (please see column 3, lines 11-35). The chromatic dispersion characteristics of the diffractive surface therefore is implicitly opposite, (in sign and direction), to fourth *refractive* lens. Also, the only definition of the "fourth lens" in the instant application is a lens with *negative* refractive optical power. Ogata particularly teaches that the diffractive surface can be formed on a refractive lens of negative refractive power to correct the chromatic aberrations, (please see column 4, lines 1-3, column 5, lines 35-38 wherein the third lens group is of negative refractive power). Furthermore, since the chromatic dispersion of a diffractive surface is always in opposite direction to the chromatic dispersion of a refractive lens, it is implicitly true by forming a diffractive surface on a refractive lens, (such as the third lens, but again the order of the lens is arbitrary) it will force chromatic aberrations to decrease thus enhancing chromatic aberration correction.

We concur with the examiner's findings on pages 13 and 14 of the answer. Additionally, we note that claim 62 is dependent upon claim 19 and includes the limitations "wherein the fourth lens and the diffractive optical element have chromatic dispersion characteristics opposite to one another." We find no limitations directed to the lens system being thin or that the lenses are selected to intentionally create chromatic aberrations which are corrected by the diffraction lens, as argued by appellants. In as much as appellants are arguing that we would need to find that the references teach intentionally introducing a chromatic aberration to support a finding of motivation to include a diffractive element to correct the chromatic aberration. We are not persuaded. The examiner finds, on pages 9 and 10 of the answer, that chromatic aberrations are inherent in lens systems and are dependent upon the materials used to make the lenses. Thus, using a diffractive element to correct chromatic aberrations does not require a finding that chromatic aberrations in the lens system were intentionally created. Accordingly, we are not persuaded by appellants' argument directed to claim 62, and we sustain the examiner's rejection of claim 62.

Appellants state, on pages 6 and 14 of the brief, that claims 63, 64, 68 through 70, 74 through 76 are grouped with claim 62. On page 14 of the brief, appellants acknowledge that claims 64, 70 and 76 are rejected using a different reasoning than applied to claim 62 (the rejection includes a third reference,

Maruyama). However, appellants assert that Maruyama does not cure the alleged deficiencies of the rejection based upon Moskovich and Ogata. Accordingly, we sustain the examiner's rejection of claims 63, 64, 68 through 70 and 74 through 76 for the same reasons discussed with respect to claim 62.

Rejection of claim 66 and the claims grouped with claim 66.

Appellants argue on pages 16 and 17 of the brief:

The Office Action asserts that "Moskovich teaches that the second lens has the majority of the refractive power ... The correction of aberrations therefore is mainly directed to the aberration created by the second lens." See the Office Action dated July 15, 2003, page 5, second paragraph. However, Moskovich does not disclose or suggest the use of a diffractive optical element and therefore provides for correction of any aberrations of the second lens through the remainder of the lenses in the system and not a diffractive optical element. Therefore, Applicants respectfully submit that one of ordinary skill in the art would not look to Ogata to cure the deficiencies of Moskovich as Moskovich corrects any and all aberration problems through the use of the other lenses in the system not through the use of a diffractive optical element. Therefore, a diffractive optical element would be redundant at best and would not be required or even desired to correct any aberrations in Moskovich, and the combination of Ogata and Moskovich would not disclose the thin projection system as recited in claim 66.

We are not persuaded by the appellants' argument. Claim 66 is dependent upon claim 19 and includes the limitations "the second lens provides the majority of the positive refractive power and the diffractive optical element corrects aberrations caused by the second lens, thus allowing providing a thin projection system." Further, as discussed *supra* with respect to independent claim 19, we find ample evidence in the references to support the examiner's finding of motivation to modify Moskovich to include a diffractive element.

Accordingly, we sustain the examiner's rejection of claim 66.

On page 6 of the brief, appellants group claims 72 and 80 with claim 66. Accordingly, we sustain the examiner's rejection of claims 72 and 80 for the same reasons as discussed with respect to claim 66.

Rejection of claim 73 and the claims grouped with claim 73.

Appellants argue, on pages 17 and 18 of the brief, that while Moskovich teaches the first, third and fourth lenses have an aspheric surface, Moskovich fails to disclose or suggest using any additional corrective elements, such as a diffractive element in the lens.

We are not persuaded by appellants' argument. As stated *supra* with respect to claim 19, we find ample evidence in the references to support the examiner's finding of motivation to modify Moskovich to include a diffractive element. Accordingly, we sustain the examiner's rejection of claim 73.

On page 6 of the brief, appellants group claim 81 with claim 73. Accordingly, we sustain the examiner's rejection of claim 81 for the same reasons discussed with respect to claim 73.

Other Issues

We note, on page 7 of the answer, the examiner notified appellants that she finds that claims 61 and 62 are substantially duplicates of claims 67 and 74. As such, the examiner has identified that should claims 61 and 62 be found allowable, claims 67 and 74 would be objected to under 37 CFR 1.75. Further, on page 16 of the answer, the examiner states that since claims 67 and 74 are

objected to with respect to a double patenting rejection, the objections cannot be appealed. Appellants, on page 19 of the brief, argue that the issue should be resolved after allowance and the rejection should be stayed until after allowance of the claims.

We concur with appellants. As stated *supra*, we sustain the examiner's rejection of claims 61, 62, 67 and 74. As these claims are not allowed, and the examiner has identified that objection would apply if claims 61 and 62 are found allowable, we consider the issue not ripe for review. Further, we are not convinced we have jurisdiction under 35 U.S.C. § 134 (a), as there is no stated rejection.

Conclusion

Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief or by filing a reply brief have not been considered and are deemed waived by appellants (see 37 CFR § 41.37(c)(vii)). Support for this rule has been demonstrated by our reviewing court in *In re Berger*, 279 F.3d 975, 984, 61 USPQ2d 1523, 1528-1529 (Fed. Cir. 2002) wherein the Federal Circuit stated that because the appellants did not contest the merits of the rejections in his brief to the Federal Circuit, the issue is waived. *See also In re Watts*, 354 F.3d 1362, 1368, 69 USPQ2d 1453, 1458 (Fed. Cir. 2004).

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In summary, we sustain the examiner's rejections of claims 19 through 25 and 61 through 82 under 35 U.S.C. § 103 (a). The decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

JAMES D. THOMAS)
Administrative Patent Judge)
LANCE LEONARD-BARRY)
Administrative Patent Judge)
ROBERT E. NAPPI)
Administrative Patent Judge)
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